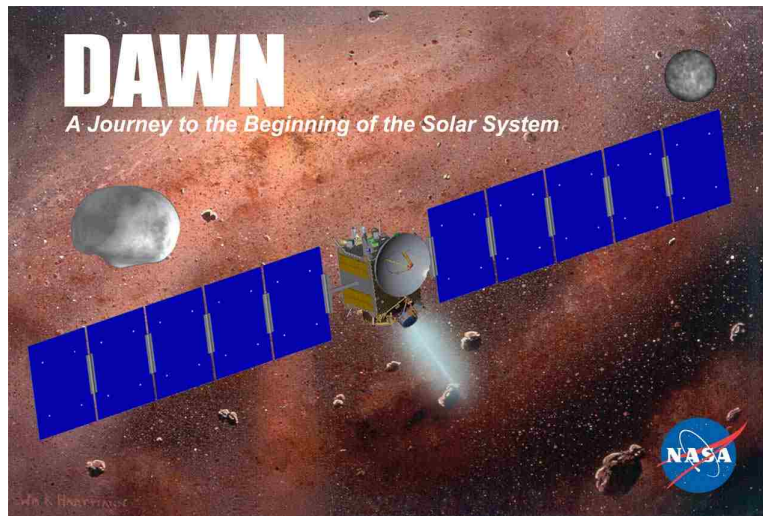


**DAWN MISSION EDUCATION AND PUBLIC OUTREACH
ANNUAL EVALUATION REPORT:
AUGUST 1, 2009–JULY 31, 2011**



Submitted to

NASA Dawn Mission E/PO Team

Submitted by

Magnolia Consulting, LLC



October 14, 2011

Cover credit: Background painting, "A cocoon nebula, perhaps the primordial solar nebula" by William K. Hartmann. Courtesy of UCLA.

ACKNOWLEDGEMENTS

This evaluation study represents a collaborative effort involving E/PO team members from McREL and New Roads School. Magnolia Consulting would like to thank members of the E/PO team including John Ristvey, Joe Wise, Whitney Cobb, Judy Counley, Nicole Hess, Mary Cullen, and Sandra Weeks for their contributions to the evaluation process. Their support of formative evaluation activities during program planning and development reflects their strong intent and determination to provide high-quality outreach materials and resources on behalf of NASA's Dawn Mission. We also would like to acknowledge the many individuals graciously responded to the evaluators' information requests and shared meaningful thoughts and valuable insights throughout the data collection process.

Stephanie Baird Wilkerson, Ph.D.

Mary Styers, Ph.D.

Carol Haden, Ed.D.

TABLE OF CONTENTS

INTRODUCTION	1
The Dawn Education and Public Outreach Initiative	1
EVALUATION DESIGN	2
Evaluation Questions.....	3
Data Collection	3
FINDINGS	4
Developing and Disseminating High-Quality Products and Services	4
Promoting Mission Awareness and Participation	16
SUMMARY	24
RECOMMENDATIONS	25
APPENDIX A	26
Logic Model for Dawn Delivery and Communication Components	27
Logic Model for Dawn Education Development Component	28
Logic Model for Dawn Evaluation Component	29
APPENDIX B	30
Evaluation Matrix	30
APPENDIX C	31
Dawn EPO Team Response to Recommendations	31

LIST OF FIGURES

Figure 1: Dawn framing camera mosaic image of Vesta's south pole.....	1
Figure 2: Total number of hard-copy materials disseminated to target audiences in 2009–2010 and 2010–2011	5
Figure 3: The top ten most frequently viewed pages on the Dawn Web site, 2009–2010 and 2010–2011 ..	8
Figure 4: The top ten most frequently viewed PDF pages on the Dawn Web site, 2009–2010 and 2010–2011	9
Figure 5: Web users' method of accessing the Dawn Web site, 2009–2010 and 2010–2011	9
Figure 6: Survey respondents' method of accessing the Dawn Web site in 2009–2010 (n = 20) and 2010–2011 (n = 522).....	10
Figure 7: Mean ratings of agreement with statements about the Dawn Web site, 2009–2010 (n = 20) and 2010–2011 (n = 494).....	11
Figure 8: Degree to which the Dawn Web site met user needs in 2009–2010 (n = 19) and 2010–2011 (n = 488)	11
Figure 9: Mean ratings of Web site utility in 2009–2010 (n = 16) and 2010–2011 (n = 425).....	12
Figure 10: Mean ratings of interest and awareness following a visit to the Dawn Web site in 2009–2010 (n = 20) and 2010–2011 (n = 493).....	13
Figure 11: Participant mean ratings of the overall Dawn Web site in 2009–2010 (n = 19) and 2010–2011 (n = 501).....	14
Figure 12: Dawn Mission Web site requests for additional resources in 2009–2010 (n = 20) and 2010–2011 (n = 522)	14
Figure 13: Locations of Vesta Fiesta public and private events	17
Figure 14: Celebrating Vesta Fiesta at the Flagship event in Pasadena, CA.....	17
Figure 15: Total hard-copy materials disseminated at Vesta Fiesta events	18
Figure 16: Number of page views in the Vesta Fiesta event section of the Web site between April 2011–September 2011	19
Figure 17: Explaining the Dawn Mission at the Vesta Fiesta Flagship event in Pasadena, CA	20
Figure 18: Number of Vesta Fiesta activity downloads	20

Figure 19: Looking at Patterns in the Sky Activity at the Vesta Fiesta Flagship event in Pasadena, CA...	21
Figure 20: Students getting ready to participate in the Dawn Relay Race at the Vesta Fiesta Flagship event in Pasadena, CA	21
Figure 21: How event hosts heard about Vesta Fiesta (n = 49).	21
Figure 22: Visitors looking at the night sky through 250mm Cassegrain telescopes at Vesta Fiesta a Saint-Barthélemy in Italy	22
Figure 23: How event hosts invited people to their Vesta Fiesta event (n = 52)	22
Figure 24. Event host reports of activities at Vesta Fiesta events (n = 52).	23
Figure 25: Event host perceptions of Vesta Fiesta game and activity quality (n = 35).....	23
Figure 26: User reports of why they decided to host a Vesta Fiesta event (n = 52).....	24

LIST OF TABLES

Table 1: Common categories of user feedback on what they liked about the Dawn Web site in 2009–2010 and 2010–2011	15
Table 2: Common categories of user feedback on what could be improved about the Dawn Web site in 2009–2010 and 2010–2011	16

INTRODUCTION

As part of its Discovery Program, NASA awarded funding for the Dawn Mission in December 2001. Dawn, the first mission to the Main Asteroid Belt, investigates Ceres and Vesta, two of the largest protoplanets remaining intact since their formation. The mission addresses the role of size and water in determining the planets' evolution by measuring their mass, shape, volume, and spin rate with imagery and gravitational analysis of the spacecraft motion. Through this investigation, scientists aim to characterize the conditions and processes of the solar system's earliest epoch.¹ The Dawn Mission offers a variety of information and data for informal and formal educators as well as the public:

It [Dawn] brings images of varied landscapes on previously unseen worlds to the public including mountains, canyons, craters, lava flows, polar caps, and, possibly, ancient lakebeds, streambeds, and gullies. Students can follow the mission over an entire K–12 experience as the mission is built, cruises to Vesta and Ceres, and returns data.²

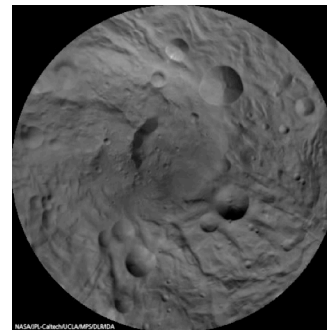


Figure 1. Dawn framing camera mosaic image of Vesta's south pole. Image credit: NASA/JPL-Caltech/UCLA/MPS/DLR/IDA.

Dawn began its trek with a successful launch on September 27, 2007. The craft reached Vesta in 2011 (Figure 1) and, after orbiting Vesta for approximately one year, will travel another two years to reach Ceres with an end-of-mission date of 2015.

THE DAWN EDUCATION AND PUBLIC OUTREACH INITIATIVE

Dawn E/PO consists of a national team of Education and Public Outreach (E/PO) specialists from the New Roads School (Santa Monica, CA) and Mid-continent Research for Education and Learning (McREL) who develop and disseminate high-quality educational resources and materials in support of NASA's Dawn Mission. Dawn E/PO delivers emerging technology and scientific knowledge to the public, classroom teachers and students, and informal educators and participants. Through the Dawn E/PO Web site, students, educators, and the public engage in age-appropriate mission activities. For example, they may include, analyzing images for cratering, doing photometry on images to produce light curves, and discussing with mission scientists the importance of Vesta and Ceres to our understanding of solar system origins. Dawn E/PO concurrently uses innovative, educational tools to encourage student collaboration, visualization, and peer review in ways that conform to and further define the national standards in math and science education.³

Target Audiences

Dawn's target audiences include the following:

1. educators (K–post secondary teachers and students);
2. general public members (businesses, parents, politicians, adult learners, and retirees);
3. media journalists⁴ (national and local, broadcast, print, trade publications, Internet, instructional

¹ Dawn: A Journey to the Beginning of the Solar System (2002). Retrieved from <http://www-ssc.igpp.ucla.edu/dawn/>

² Dawn Science Web site: <http://www-ssc.igpp.ucla.edu/dawn/>

³ Excerpt from the Dawn Mission E/PO final proposal, July 21, 2000.

⁴ Media requests are deferred to JPL media relations; however, Dawn E/PO provides press packets and resources for media professionals through the Dawn Mission Web site.

TV, radio, and public service announcements);

4. informal educators (science museums/centers, arts community, speakers bureaus, youth programs, and service clubs); and
5. disadvantaged and underserved populations.

E/PO Approach and Outcomes

The Dawn E/PO team uses a strategic outreach approach that supports NASA's vision and the Dawn E/PO intended outcomes. This approach is based on four components: Delivery, Communication, Education Development, and Evaluation. In conceptualizing its work based on the outreach model's four components, the E/PO team identified eight long-term ultimate outcomes, which are supported by 17 intermediate outcomes. Evaluators and team members created logic models to illustrate the activities, intermediate outcomes, data collection methods, and ultimate outcomes for each component (refer to Appendix A). The eight ultimate outcomes are listed:

1. E/PO efforts reach broad target audiences through high-quality products and dissemination mechanisms. Primary contacts share what they learn about the Dawn Mission and associated science with their colleagues.
2. Because of the knowledge and skills obtained from Dawn E/PO products and activities, participants better understand the solar system's formation.
3. As a result of using Dawn E/PO products and activities, participants are interested in solar system science.
4. Students will conduct science with a real-life context leading to increased academic achievement.
5. Educators better understand how to implement inquiry processes leading to improved practices.
6. Dawn E/PO products and services are of high quality and utility because they reflect audience needs.
7. Dawn E/PO can demonstrate the effectiveness of its outreach as evidenced by the impacts of its high-quality products and activities.
8. Future mission E/PO efforts will have a blueprint from which to make informed decisions based on extensive documentation of lessons learned from Dawn E/PO.

EVALUATION DESIGN

The evaluation emphasizes a collaborative approach to evaluation, which requires the active participation of E/PO program staff in the design and implementation of the evaluation work. The evaluation design includes both qualitative and quantitative methods to provide meaningful formative and summative information. Formative evaluation information provides feedback to project staff, which is intended to guide project planning and development and also allows for a continuous reflective process throughout project implementation. Summative evaluation information addresses the progress made toward intended outcomes of the outreach effort with a description of how the desired outcomes were realized. Furthermore, logic models were developed as a tool for defining and depicting how project activities connect to project intermediate and ultimate outcomes.

EVALUATION QUESTIONS

There are seven overarching evaluation questions, which link to E/PO intended project outcomes and are supported by additional evaluation questions, information sources, and data collection methods (see Appendix B for the Evaluation Matrix). The following key evaluation questions reflect E/PO priorities since 2003 and focus on impacts of the outreach initiative on the public, teachers, and students as well as the quality and utility of materials and resources.

1. Do users of the Dawn E/PO products and services perceive them to be of high quality and utility?
2. To what extent do formal and informal educators and students access and use the Dawn E/PO materials and resources?
3. To what extent do public members access and use the Dawn E/PO materials?
4. Are participating students engaged and interested in the Dawn Mission science because of using E/PO materials?
5. Do participating students have an increased understanding of the formation of the solar system?
6. To what extent has the Dawn E/PO effort enhanced participating teachers' abilities to teach space science?
7. To what extent has the Dawn E/PO effort affected public interest in and understanding of the Dawn Mission?

This evaluation period focused on key questions 1, 3, and 7 and reflects the primary E/PO activities since August of 2009.

DATA COLLECTION

The evaluation design encompasses both qualitative and quantitative methodology and, in some cases, more than one data collection method is used to address a given evaluation question to strengthen the credibility of the findings. Data collection methods during this reporting period include Web statistics, a Web-based survey, and dissemination data. Evaluation instruments implemented during this reporting period include the following:

- Dawn Web site survey. This 12-item online survey is intended for anyone who visits the Dawn Web site and wants to provide feedback regarding its quality and utility.
- Vesta Fiesta Host survey. This online survey was for community members and informal and formal educators who hosted a Vesta Fiesta on August 5-7, 2011. The nine-item survey was sent to hosts after the event and solicited their feedback on the event and the Vesta Fiesta materials and resources.

Evaluation activities during the reporting period included instrument development, data collection, and indicator development for Vesta Fiesta, and analysis of all Vesta Fiesta data. The findings presented in this report are based on the results of the Web site survey, Web statistics for the Dawn Web site, and the Vesta Fiesta survey. Additionally, evaluators document dissemination of Dawn mission science through presentations at conferences and public events.

FINDINGS

This reporting period from August 1, 2009 to July 31, 2011 continues to build on the excitement of the launch of the Dawn spacecraft on September 27, 2007. Since its launch, the Dawn spacecraft has completed various tests, engaged in a Mars gravity assist, and used the ion propulsion system to thrust along its trajectory to Vesta, where it will orbit for about a year, starting in summer of 2011. E/PO team members were active in all aspects of outreach including a complete Web site redesign as well as regular updates, Web site content development and design, material production, outreach dissemination, and Vesta Fiesta planning and launch.

This section presents findings related to key evaluation questions and is organized into the following sections: Developing and Disseminating High-Quality Products and Services, and Promoting Mission Awareness and Participation.

DEVELOPING AND DISSEMINATING HIGH-QUALITY PRODUCTS AND SERVICES

The Dawn E/PO team develops and disseminates a variety of mission-related products and services to target audiences. To update the Dawn website to align with NASA's Jet Propulsion Laboratory's web specifications, Raytheon Web Solutions in Pasadena, California submitted a Project Description in January 2010. It identified in detail re-usable components and those that would be new in the site redesign, along with a comprehensive timeline and schedule. A complete inventory of the site was captured in a site map, and Dawn Outreach set up a cross-platform FTP site that Raytheon and McREL shared to transport assets and web documents, with the goal of hosting the site on the existing server. Included in the proposal was a migration plan, a testing plan, description of the staging environment and a security plan—including a procedure for 508 compliance.

The Development phase consisted of converting 175 pages from the old design to the new design; verifying that the navigation and layout of the site was accurate; developing site-wide header/footer navigation; 508 compliance security testing, launching the site and addressing feedback. These phases were all completed and new site launched in January 2011. The new site has been met with enthusiastic feedback from the Dawn science team and community.

E/PO products undergo a rigorous review process including expert review, pilot and field-testing, and multiple revision periods. E/PO products include educational materials for a variety of target audiences and are disseminated primarily through the Web site, professional conferences, formal and informal educational settings, and public E/PO engagements. E/PO services include professional development workshops, conference presentations, Web site development, and information dissemination. This section presents development and dissemination information about the different E/PO products and services.

Product Development

The Dawn E/PO team specializes in translating mission science into educational learning opportunities for students and public members. The E/PO educational materials include Web-based information and resources as well as supplemental curriculum materials and activities for formal and informal educators and students. To date, the E/PO team has developed three mission instrument interactives, three content modules (*History and Discovery of Asteroids*, *Ion Propulsion*, and *Interactions of Energy & Matter*), as well as various supplemental activities/tools such as *Find a Meteorite (FAM)*, *Career Connections*, *Potato Light Curves*, *Modeling in3-D*, *Vesta Flip Book*, *Gamma Ray and Neutron Detector (GRaND) Interactive*, and the *Dwarf Planet Activity*.

During this reporting period, the Dawn team worked on promoting the mission in a range of ways. The science and technology of Dawn's instrument payload was made accessible to audiences through the development of the Framing Camera and VIR interactives. Vesta Fiesta, an outreach event in the

summer of 2011, heralded Dawn's arrival at Vesta and ensuing exploration by inviting uniquely diverse audiences to celebrate. Vesta Fiesta Web pages allowed participating museums, planetariums, amateur astronomer groups, and schools to add their events to an international map, engaging audiences around the world in learning about Dawn's mission to Vesta and Ceres. A new set of activities for Out-of-School Time (OST) audiences was promoted through *Vesta Fiesta Leader Guides*; many Vesta Fiesta sites reported enjoying them, and families were entranced by the activities at the flagship Vesta Fiesta in Pasadena, CA. The team also provided constant updates on the mission, including sharing how Dawn scientists practice imaging Vesta's surface, distinguishing between asteroids and protoplanets, updating users when Dawn exited out of hibernation, and starting in August, 2011 keeping users abreast of Dawn's science findings and latest images of Vesta through the *Image of the Day*.

Outreach Dissemination and Visibility

Dawn E/PO team members disseminate materials and resources ranging from Dawn Mission Bookmarks to the Dawn Mission e-newsletter and from mission-related activities for children to standards-based curriculum modules for teachers and secondary students. This section provides data about the various information dissemination and visibility activities that E/PO members supported during the project period. Figure 2 presents quantities of hard-copy project materials disseminated during the reporting period.

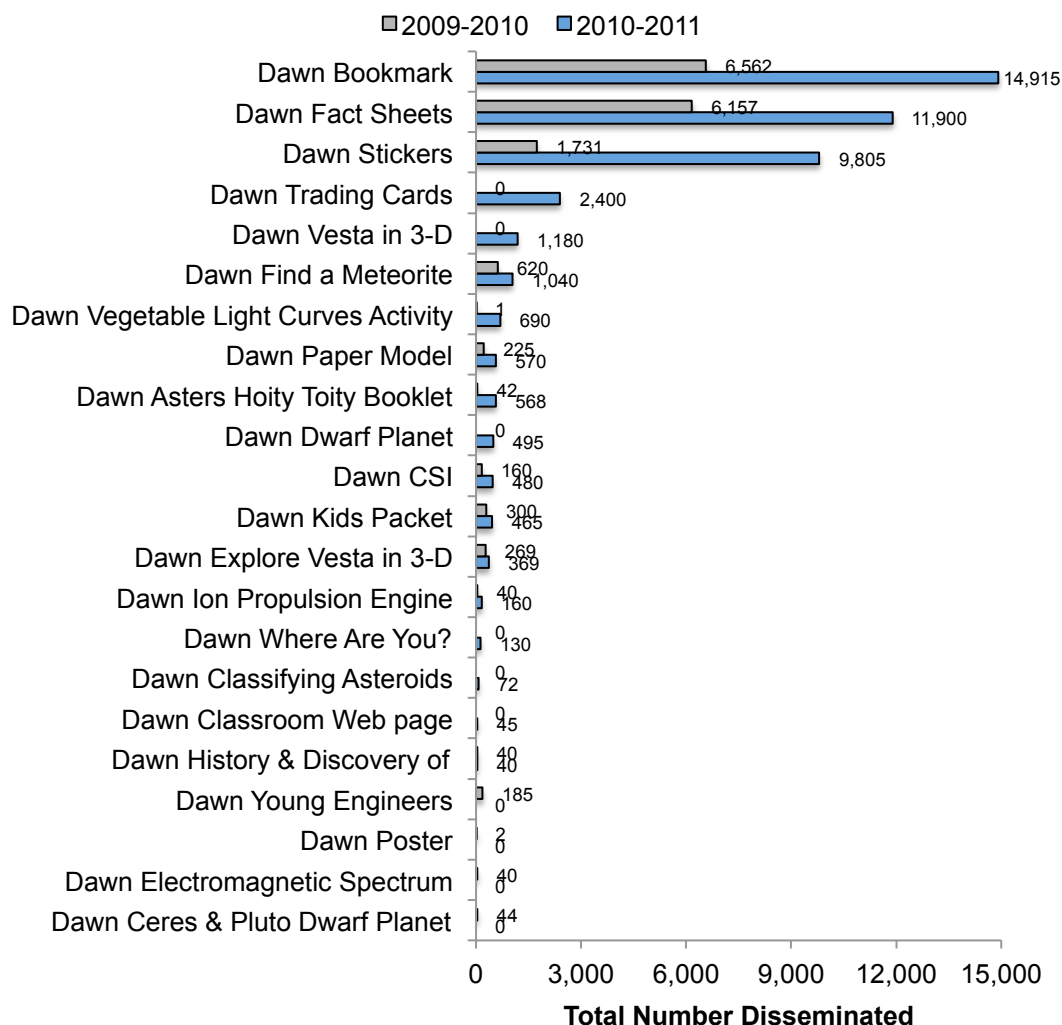


Figure 2. Total number of hard-copy materials disseminated to target audiences in 2009–2010 and 2010–2011.

Across both reporting periods, the Dawn E/PO team frequently disseminated Dawn Bookmarks (6,562 in 2009–2010; 14,915 in 2010–2011), Dawn Fact Sheets (6,157 in 2009–2010; 11,900 in 2010–2011) and Dawn Stickers (1,731 in 2009–2010; 9,805 in 2010–2011). The team also distributed a variety of Dawn Trading Cards, activities, packets, and classroom materials (see Figure 2 for complete list).

During the 2009–2010 and 2010–2011 reporting periods, team members developed and disseminated Dawn Mission e-newsletters to 6,124 subscribers and 6,483 subscribers, respectively. The quarterly newsletter increased to monthly in October of 2010 to reflect increased science and engineering team activity in preparation for arrival at Vesta and the ensuing period of time Dawn is exploring the protoplanet. These numbers represent an increase from 4,896 subscribers in the 2008–2009 reporting period. Subscribers register for the e-newsletter through the Dawn Mission Web site or by completing a subscription form at professional conferences attended by the Dawn Mission E/PO team.

Other ways that E/PO members reach their target audiences are through presentations at workshops, conferences, and public events. During this reporting period, E/PO team members leveraged resources by joining other Discovery mission outreach providers in presenting thematic workshops that focused on cross-mission science topics. During these workshops, participants across the country learn about the storyline of Dawn and how the mission contributes to our overall understanding of the origins of the solar system. A sample of workshops during the reporting period include the following:

Dawn webcast: Webcast for Challenger Centers, attended by individuals and Challenger Learning Centers of Brownsburg and Suffern: August 2009
Dawn Discovery: Teacher professional development in Boaz, AL: October, 2009
Modeling Asteroids in 3-D & Flipping Through Vesta: Thematic workshops at Colorado Science conference in Denver, CO: November, 2009
Journeys through Space and Time: Webcast for Challenger Centers: December, 2009
Comet Conundrums, Asteroid Adventures: Teacher workshop at the National Afterschool Association Conference in Washington, DC: April, 2010
Investigating Asteroids: Teacher workshop at the Astronomical Society of the Pacific meeting in Boulder, CO: July, 2010
Dawn materials: Presented Dawn materials to teachers and students in St. Augustine, FL, Fayetteville, TN: October, 2010
Exploring Small Worlds: EPOXI Encounter with Hartley 2, Denver Museum of Nature and Science, CO
NASA Week: EPOXI Encounter with Hartley 2, Fayetteville, Tennessee: October, 2010
NSTA Regional Conference: Dawn materials workshop in Kansas City, MO: October, 2010
Find a Meteorite: Presentation at Colorado Science Conference in Denver, CO: November, 2010
SD NExT Educator Workshop: Stardust-NExT Encounter with Tempel 1, Pasadena, CA and Ithaca, NY: February, 2011
Thrill of Discovery: Thematic workshops in Pasadena, CA, Houston, TX, Champlin, MN, Laurel, MD: March, 2011
NSTA National Conference: Year of the Solar System Short Course in San Francisco, CA: March, 2011
Small Bodies Big Concepts: Two-week professional development in Denver, CO, Tucson, AZ: July, 2011

Additionally, E/PO team members provide articles for the general public on the Dawn Mission. A sample of articles from the current reporting period include the following:

Cobb, W., Rountree-Brown, M., & Warner, E. (2011). Inquiry into the heart of a comet. *Science & Children*, 48(6), 46–49.
Connolly, M. (2011, July 25). Take a Dawn journey to the asteroid belt. *Estes Park Gazette*. Retrieved from http://www.eptail.com/ci_18524382
Goldstein, A. (2011, January 19). Aurora library exhibit bringing space science down to Earth. *Aurora Sentinel*. Retrieved from http://www.aurorasentinel.com/hp_metro/article_8dcba3cc-243a-11e0-8179-001cc4c03286.html
Ristvey, J.D., & Wise, J.A. (2010). Investigating Asteroids: A mission storyline- past, present and future. In *Earth and Space Science: Making Connections in Education and Public Outreach*: Vol 443, p. 69.

Dawn Mission Web Site: Usage Statistics

The Dawn Web site is a comprehensive information source and dissemination mechanism for the Dawn

Mission. Across the 2009–2010 and 2010–2011 reporting periods, team members developed and launched the aforementioned Web site redesign, as well as made a variety of updates, additions, and enhancements to the Dawn Web site including timely mission status updates and an *Image of the Day* from Vesta. During this reporting period, the Dawn team also created social media accounts for the mission. A Twitter account was created November 2, 2009 and currently has 4,127 followers. Similarly, a Facebook profile was established September 3, 2010, and the account currently has 1,356 Facebook friends.

From August 2009 through July 2010, the site received 2,675,983 hits, 754,973 page views, and 11,134 visitor sessions.⁵ Almost all visitors (99%) accessing the Web site were from the United States; there was also a small amount of activity from China, Germany, Greece, and Australia. The majority of sessions (75%) lasted less than 30 seconds, 6% lasted thirty seconds to 2 minutes, 4% lasted 2 to 5 minutes, and 15% lasted longer than 5 minutes.

In comparison, from August 2010 through July 2011, the site received 4,400,517 hits, 2,023,200 page views, and 11,927 visitor sessions. Almost all visitors (96%) accessing the Web site were from the United States; there was also a small amount of activity from China, Germany, Great Britain, Greece, and Australia. The majority of sessions (78%) lasted less than 30 seconds, 6% lasted thirty seconds to 2 minutes, 3% lasted 2 to 5 minutes, and 13% lasted longer than 5 minutes.

Figure 3 shows the top ten most viewed Web pages of the Dawn Web site during the 2009–2010 and 2010–2011 reporting periods. Across both reporting periods, the Dawn Homepage, Mission Section: Where is Dawn Now? page, and the Mission Section: Main Page had the most page views. Site traffic more than doubled between the 2009–2010 and 2010–2011 reporting periods.

⁵ A visitor session is a session of activity (all hits) for one visitor of a Web site.

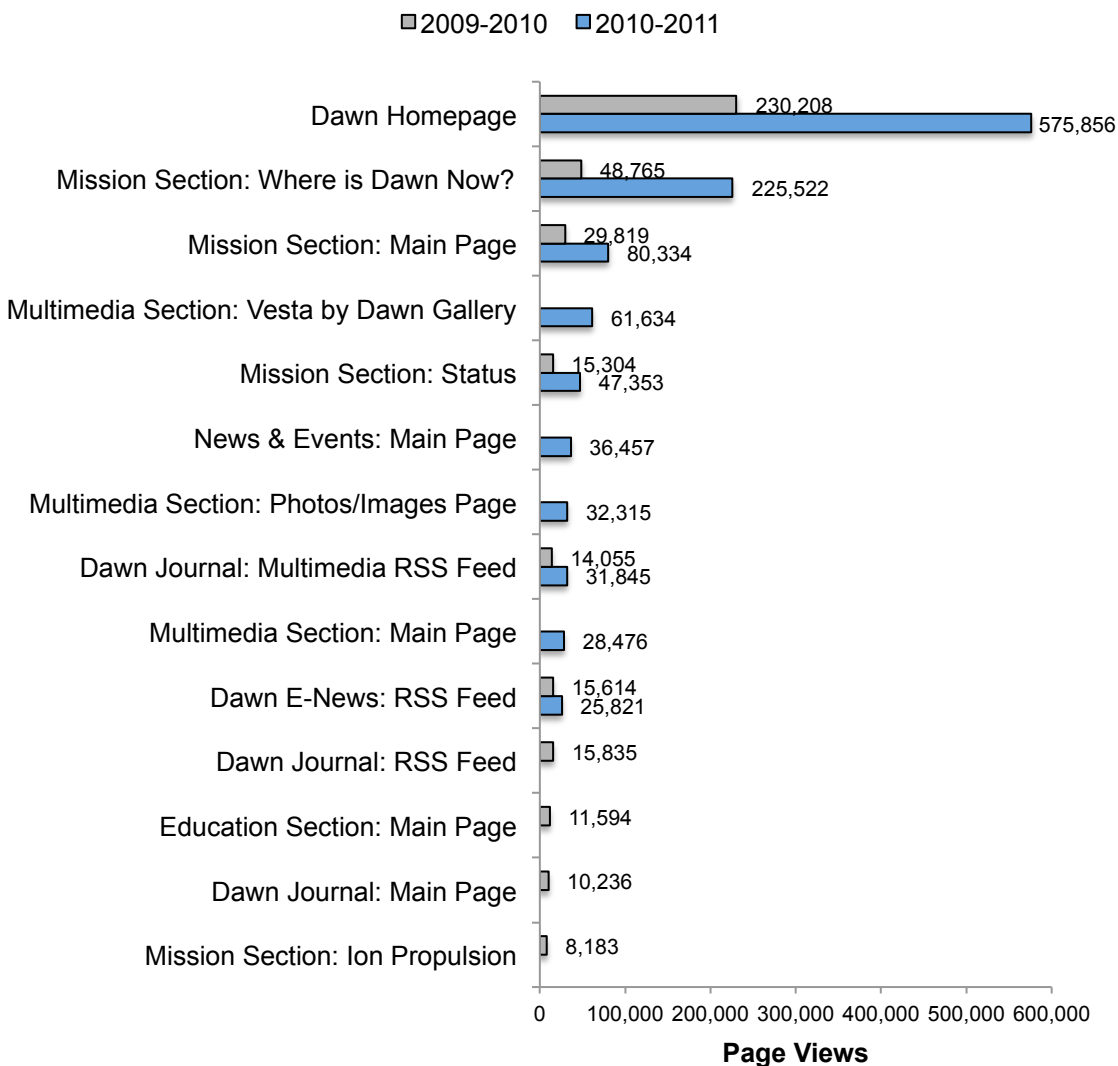


Figure 3. The top ten most frequently viewed pages on the Dawn Web site, 2009–2010 and 2010–2011.

The Dawn Web site offers many PDF documents that can be downloaded by visitors. During the 2009–2010 and 2010–2011 reporting periods, the Mission Fact Sheet was the most frequently viewed PDF document, receiving 4,391 views and 5,035 views, respectively (see Figure 4). Other popular downloads included various Ion Propulsion pages, the Main Asteroid Belt article, Dawn Mission Overview, Thinking Outside the Box Reading, Spacecraft Model Pattern, and Modeling Asteroid Vesta in 3-D.

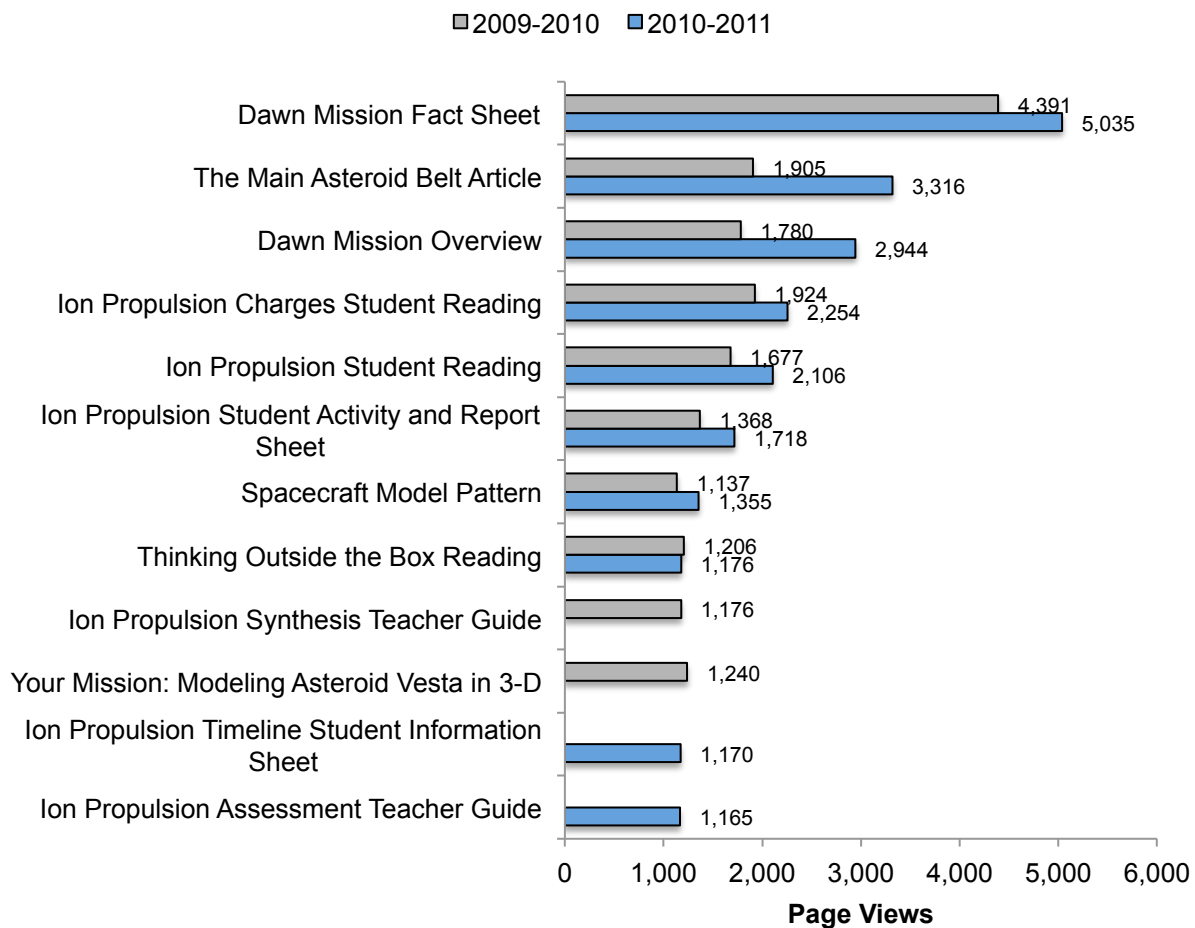


Figure 4. The top ten most frequently viewed PDF pages on the Dawn Web site, 2009–2010 and 2010–2011.

Target audiences can learn about the Dawn Web site through the Dawn e-newsletters, search engines, and links from other space science Web sites. During the 2009–2010 study period, 46% of page views originated from an external or another Dawn site page, 44% originated from direct address or bookmarks, and 10% from an Internet search engine (see Figure 5). Similarly, during the 2010–2011 study period, 50% of page views originated from an external or another Dawn Web site page, 41% originated from direct address or bookmarks, and 9% from an Internet search engine (Figure 5).

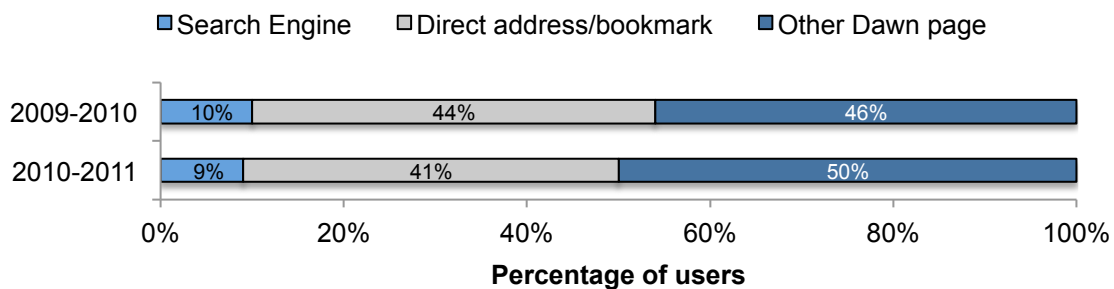


Figure 5. Web users' method of accessing the Dawn Web site, 2009–2010 and 2010–2011.

Dawn Mission Web Site: User Evaluation Survey

The Dawn Mission Web Site Evaluation Survey assessed user perceptions of the site's quality and utility. Of the 20 users who completed the survey during the November 2009 to July 2010 reporting period, 45% identified themselves as members of the general public, 5% (one individual) as an educator, 25% as students, and 25% as members of the science community. The sole educator who responded to the 2009–2010 survey reported teaching college students. Eighty-five percent of respondents were male and 15% were female.

In comparison, 522 respondents completed the survey during the August 2010 to July 2011 reporting period. The majority of respondents identified themselves as members of the general public (65%), 15% were educators, 6% were students, and 14% were members of the science community. The 78 educators who responded to the survey during the 2010–2011 period reported teaching the following grade levels:

- K-2 ($n = 6$)
- Grades 3-5 ($n = 8$)
- Grades 6-8 ($n = 6$)
- Grades 9-10 ($n = 8$)
- Grades 11-12 ($n = 9$)
- Other ($n = 43$)

Common *other* responses included teaching at the college level ($n = 28$) or teaching at a museum or association (e.g., State Astronomical Association) ($n = 6$). Nine percent of respondents were female and 91% were male.

Across both reporting periods, respondents indicated how they learned about the Dawn Web site. The majority learned about the site through a link from another Web site or through *other* methods (see Figure 6). Within the 2009–2010 reporting period, users who selected *other* noted they found out about the Web site from other resources such as another Web site ($n = 2$) (e.g., ESA, NASA) or informational emails or news ($n = 2$). During the 2010–2011 reporting period, the most frequently mentioned *other* resources for learning about the Web site included Google or Internet searches ($n = 76$), Other Web Sites ($n = 56$) (e.g., NASA, JPL), or television or news outlets ($n = 34$).

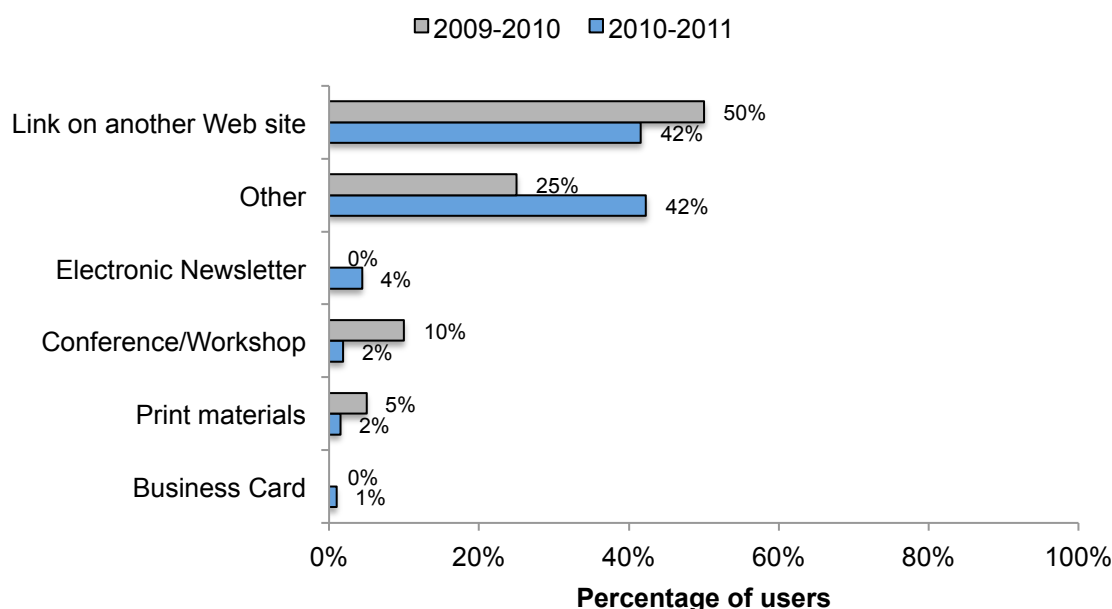


Figure 6. Survey respondents' method of accessing the Dawn Web site in 2009–2010 ($n = 20$) and 2010–2011 ($n = 522$).

The Web site survey contained several questions regarding the utility of the Dawn Web site. Respondents indicated their level of agreement on a 5-point scale (5 = *strongly agree*, 4 = *agree*, 3 = *neither agree nor disagree*, 2 = *disagree*, 1 = *strongly disagree*) with statements about organization, ease of navigation, accuracy of content, and usefulness of resources. Figure 7 presents the results for these survey items during the 2009–2010 and 2010–2011 reporting periods. User perceptions differed slightly across the two reporting periods. Overall, across both reporting periods, users *agreed* that the site serves as a useful resource for science, mathematics, and technology content and *agreed* that the site was easy to navigate. Additionally, users *agreed* that the site materials were well organized and *agreed* that the site contains accurate science, mathematics, and technology content.

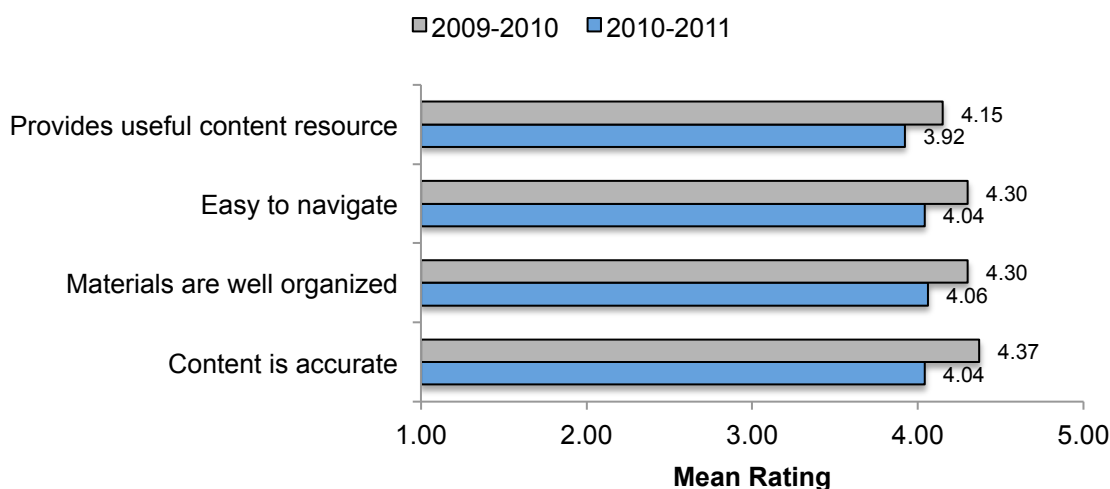


Figure 7. Mean ratings of agreement with statements about the Dawn Web site, 2009–2010 ($n = 20$) and 2010–2011 ($n = 494$).

Respondents replied to a question about the degree to which the Dawn Web site had met their needs on a 4-point scale (4 = *completely*, 3 = *mostly*, 2 = *somewhat*, 1 = *not at all*). Across both reporting periods, users believed the site *mostly* met their needs (see Figure 8).

“It would be neat if more images could be shown on this Web site. Perhaps some time lapse images of Vesta from the navigation approach could be stitched together and posted whenever scientists have the time and get the chance.” (June 2011)

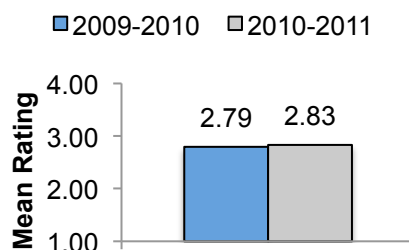


Figure 8. Degree to which the Dawn Web site met user needs in 2009–2010 ($n = 19$) and 2010–2011 ($n = 488$).

In addition to their rating of whether the site met their needs, several users provided open-ended feedback explaining their ratings. During the 2009–2010 reporting period, several respondents requested more updates or additional information ($n = 5$) such as images of Ceres, general mission updates, and more background on the Dawn spacecraft. In comparison, during the 2010–2011 reporting period, users provided a wealth of open-ended feedback with suggested Web site updates or modifications. The majority of users who provided open-ended feedback requested more images from the mission on a more

frequent basis ($n = 99$). The second most common request was for more frequent updates to the site, with requests for real-time updates ($n = 34$). Users also requested more scientific information related to the mission ($n = 12$) such as technical and raw data. An additional twelve users requested timelines of the mission or a countdown clock to each major event ($n = 12$).

Respondents also answered questions about the utility of each of the major sections of the Dawn Web site on a 3-point scale (2 = *useful*, 1 = *somewhat useful*, or 0 = *not useful*). Figure 9 presents these results. Across both reporting periods, respondents found the Mission, Technology and Science sections of the Web site to be *useful*. Additionally, in 2009–2010, respondents found the Dawn Community, Dawn Classroom, and People sections to be *useful*. Overall, mean ratings of utility were high, with users indicating that all Web site sections were at least *somewhat useful*.

In their explanations of site usefulness ratings, two respondents in 2009–2010 commented on the costs of downloading multimedia, with some requesting more data and updates from the spacecraft. During the 2010–2011 reporting period, a larger number of users offered feedback on their usefulness ratings. Similar to previous comments, the majority of respondents ($n = 74$) requested more frequent and additional images to be posted to the Web site. Several users who requested additional images ($n = 11$) suggested that the Dawn team use the NASA Cassini Solstice Mission, Mars Exploration Rover Mission, and MESSENGER Mission Web sites as a set of models for image sharing. A large number of users ($n = 21$) also requested more frequent updates to the site with updated information on the time and current activities associated with the mission.

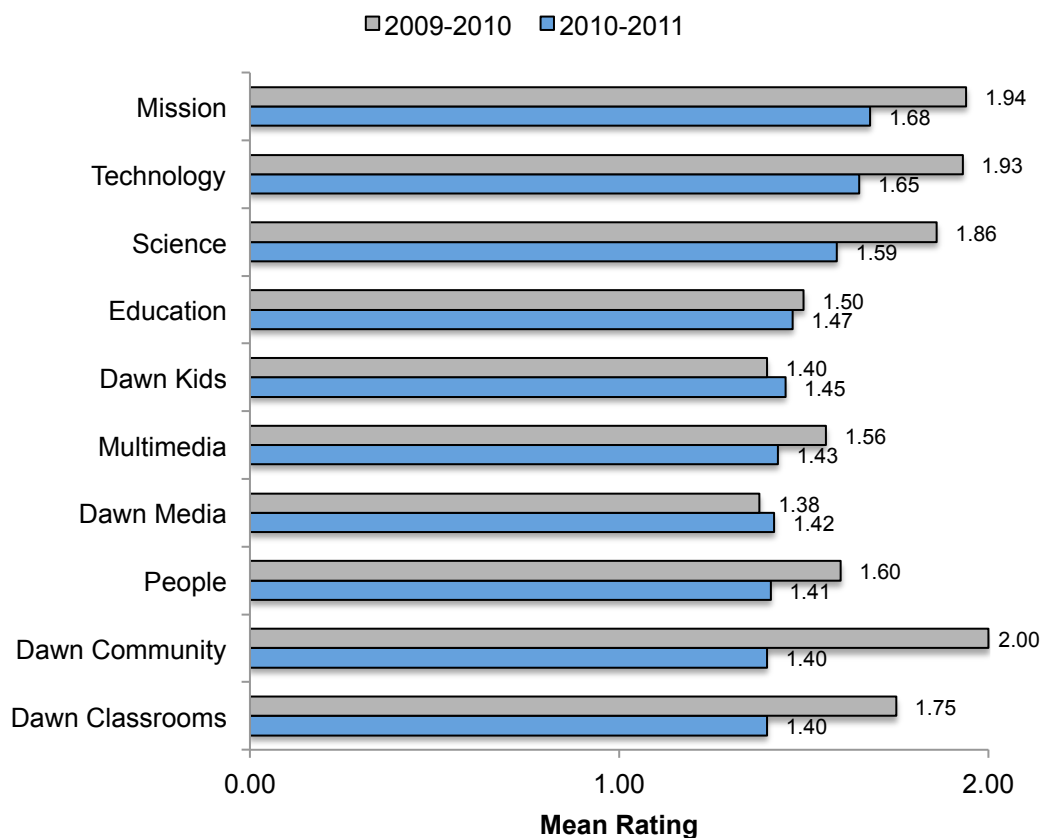


Figure 9. Mean ratings of Web site utility in 2009–2010 ($n = 16$) and 2010–2011 ($n = 425$).

Survey respondents rated their agreement with statements regarding how the Web site affected their interest in science and their awareness of science-related content on a 5-point scale (5 = *strongly agree*,

4 = *agree*, 3 = *neither agree nor disagree*, 2 = *disagree*, 1 = *strongly disagree*). Figure 10 shows mean item responses to questions related to increased interest in Dawn Mission science content and increased understanding of the formation of the solar system during the 2009–2010 reporting periods. Users *strongly agreed* (2009–2010) or *agreed* (2010–2011) that the Web site increased their interest in the Dawn Mission science content. Similarly, across both reporting periods, users *agreed* that the Web site increased their understanding of the solar system.

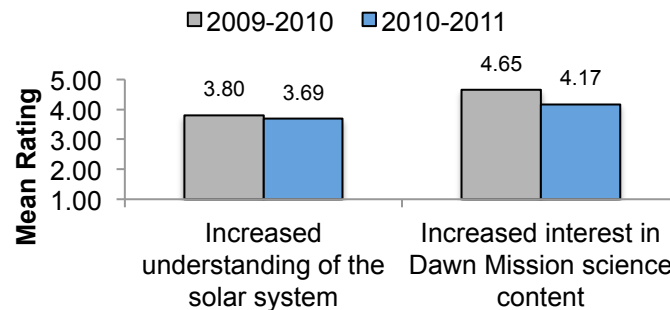
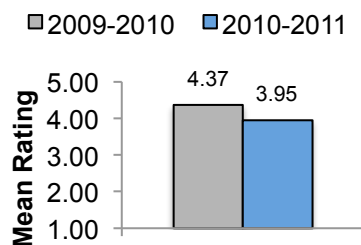


Figure 10. Mean ratings of interest and awareness following a visit to the Dawn Web site in 2009–2010 ($n = 20$) and 2010–2011 ($n = 493$).

After reviewing the Web site, several participants had additional questions about the formation of the solar system. In 2009–2010, three users had follow-up questions about asteroids and meteors such as meteorite types, asteroid belt density, and spacecraft navigation through asteroids. During the 2010–2011 reporting period, the majority of open-ended responses pertained to questions surrounding the solar system ($n = 22$), specifically movement, formation details, and theories of creation. Additionally, users had questions about Vesta ($n = 22$), requesting additional details on what it is, how it was formed, and whether it could become a threat to Earth. A handful of users had questions about how planets are defined and formed ($n = 7$), and they requested additional information on asteroid formation, age, and contents ($n = 8$).

In addition to items related to the quality and utility of the Web site, respondents replied to two questions related to their overall satisfaction with the Dawn Web site. Respondents indicated agreement or disagreement with a statement about whether they would recommend the Web site to others. In 2009–2010 all respondents (100%) *agreed* that they would recommend the site to others as compared to 87% who *agreed* in 2010–2011.

To assess perceptions of Web site quality, respondents rated the Web site on a 5-point scale (5 = *excellent*, 4 = *good*, 3 = *average*, 2 = *fair*, 1 = *poor*). Across both reporting periods, users rated the site as *good*, with slightly higher ratings in 2009–2010 compared to 2010–2011 (see Figure 11). In their open-ended responses, users across both time periods explained their ratings. During the 2009–2010 reporting period, users commented that they enjoy the site ($n = 3$) and some requested site revisions ($n = 3$) including more images, interactivities, and Web page revisions similar to the Cassini Solstice mission. In contrast, during the 2010–2011 reporting period, a larger number of users provided open-ended feedback on their ratings. The largest number of respondents ($n = 133$) had positive comments about the Web site, commenting on the overall site (e.g., content, layout). Similar to previous comments, several users requested additional images on a frequent basis and in raw form ($n = 41$) and more frequent updates with more information ($n = 35$). Additionally, respondents ($n = 31$) requested site-specific changes to allow for increased compatibility, better navigation, and more interactive or engaging components. Twelve respondents believed the site content needed to be at a higher level and requested more scientific information.



"[The site] captures the wonder and fascination of planetary science and exploration. It allows me to be a vicarious explorer on your mission." (June 2011)

Figure 11. Participant mean ratings of the overall Dawn Web site in 2009–2010 ($n = 19$) and 2010–2011 ($n = 501$).

Visitors indicated the types of materials or information they would like to see on the Dawn Web site (Figure 12). Across both reporting periods, users requested more technical data and *other* information as their top two choices. During the 2009–2010 reporting period, users who selected *other* requested more information on meteorites and asteroids ($n = 2$), additional images ($n = 2$) and additional forms of communication (e.g., blogs, status updates) ($n = 2$). Similar to previous open-ended response questions, visitors during the 2010–2011 reporting period primarily requested additional images ($n = 99$) and multimedia ($n = 11$).

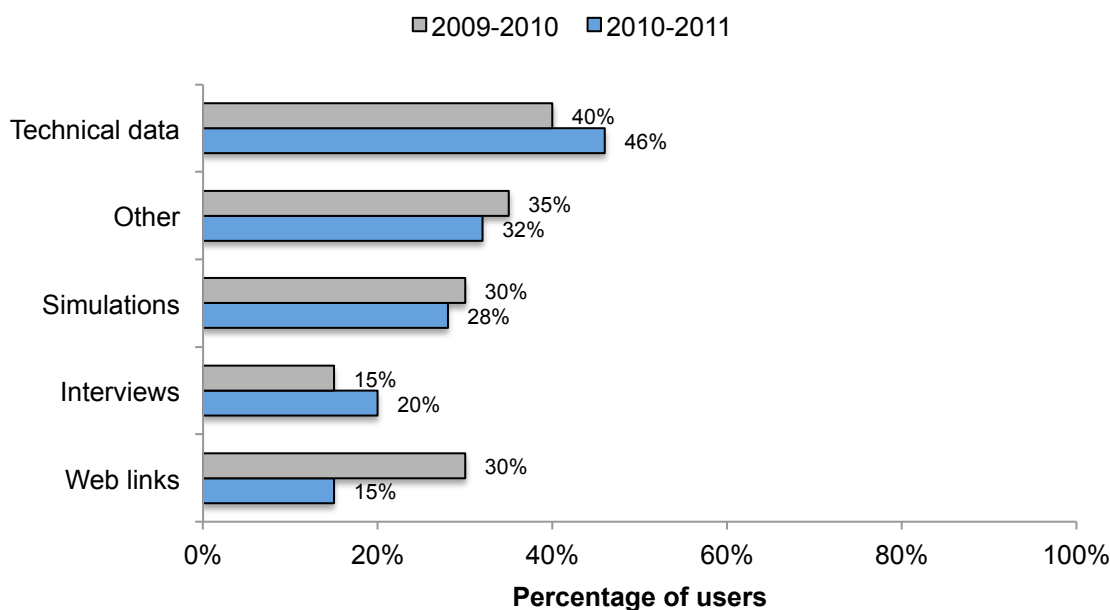


Figure 12. Dawn Mission Web site requests for additional resources in 2009–2010 ($n = 20$) and 2010–2011 ($n = 522$).

In their open-ended feedback, users offered explanations of what they liked most about the Web site (see Table 1). Overall, users across both time periods frequently mentioned the Mission Pages as what they liked most about the Dawn Web site. Within the Mission section, users mentioned the Dawn Journal, Where is Dawn now? link, Mission Multimedia, and Mission details. During the 2010–2011 reporting period, the most commonly referenced favorite site aspect was the multimedia. Users greatly appreciated the wealth of photos available to them. Additionally, across both reporting periods, users expressed appreciation for characteristics of the Web site (e.g., navigation, clarity, informative nature) and for the overall mission (e.g., existence, discovery of new information). Finally, several users also expressed an interest in “everything” about the site, the Kids & Education sections, the Technology Section, and the Science Page.

Table 1. Common categories of user feedback on what they liked about the Dawn Web site in 2009–2010 and 2010–2011.

Categories	2009–2010	2010– 2011
	<i>n</i> (%)	<i>n</i> (%)
Multimedia	1 (8%)	100 (36%)
Mission Page	4 (31%)	70 (25%)
Overall site	3 (23%)	65 (23%)
Overall Mission	3 (23%)	16 (6%)
News & Events	--	13 (5%)
Everything	--	6 (2%)
Kids & Education Sections	--	4 (1%)
Technology Section	--	4 (1%)
Science Page	2 (15%)	2 (1%)

The thing I liked most about the Web site is...

“Clear, easy to read, understandable...” (July 2010)

“Marc’s Dawn Journal and also, thanks for releasing those early Vesta images – congrats on getting data and on getting data out to the public.” (June 2011)

“The image galleries. Ceres and Vesta have been part of my consciousness from the age of 9, 63 years ago, and it is a dream come true to see Vesta’s surface come into view. I hope I live to see Dawn’s arrival at Ceres.” (July 2011)

In addition to providing feedback on what they liked about the Web site, users provided open-ended feedback on areas of improvement. During the 2009–2010 reporting period, users primarily requested updates to the Mission section such as additional information on the Dawn tracking and Ion Propulsion pages and a Mission blog. Similarly, in 2010–2011, the third most requested category of information was for updates to the Mission section, with users requesting additional information on the Dawn craft, Vesta, Ion Propulsion, and additional scientific information. The top two most common requests during the 2010–2011 reporting period surrounded multimedia and updates, similar to earlier comments. For multimedia, users requested raw, downloadable, and more frequent images. Additionally, users requested to see live feeds and be given more detailed explanations and information concerning the available pictures. Respondents also requested additional information and updates on the mission on a more frequent basis. A large number of respondents also mentioned site-specific improvements including modeling the site of other NASA sites (e.g., Mars Rover and Cassini), fixing broken links, and site layout and navigation suggestions. Finally, users also mentioned including a countdown and/or timeline of events, providing users with up-to-date results, personal suggestions for future missions, additional information on asteroids or the asteroid belt, improving issues with Web site accessibility, and including additional interactive features.

Table 2. Common categories of user feedback on what could be improved about the Dawn Web site in 2009–2010 and 2010–2011.

Categories	2009–2010 <i>n</i> (%)	2010– 2011 <i>n</i> (%)
Multimedia	1 (17%)	116 (45%)
More information/Updates	--	43 (17%)
Mission Section	3 (50%)	29 (11%)
Site Specific	--	22 (8%)
Countdown or Timeline of Events	--	15 (6%)
Results		14 (5%)
Future Missions	--	7 (3%)
Asteroids/Asteroid Belt	1 (17%)	6 (2%)
Accessibility	--	6 (2%)
Additional Interactive features	1 (17%)	1 (0.4%)

I think you could improve [the Web site] by...

“It would be fun to see how many miles/kilometers the probe has gained on Vesta in the last 24 hours, in the ‘days left’ box on the Dawn homepage.” (February 2010)

“More photos? I do realize you can’t post a new one every day just because of the length of time it takes for data to arrive and be processed, but the more, the merrier!” (June 2011)

“Update it in a timely fashion. If there is no information from the craft, then state that much.” (July 2011)

“Progress reports on the science as it unfolds, even hypotheses being tested and how these tests are going.” (July 2011)

PROMOTING MISSION AWARENESS AND PARTICIPATION

To raise awareness of the year-long orbit and exploration of Vesta, the Dawn E/PO team created a Vesta Fiesta event for August 5–7, 2011. The event Web site hosted 20 Vesta Fiesta Leader Guides with activities created specifically for Vesta Fiesta and streamed live science presentations by Christopher Russell, Carol Raymond, Bob Mase, and Pablo Gutierrez-Marques from a Pasadena Vesta Fiesta site. There were 14 private and 95 public Vesta Fiesta events held around the world (see Figures 13 and 14). The Vesta Fiesta event represented partnerships from Dawn Mission partners, Amateur Astronomy groups, NASA/JPL Solar System Ambassadors, NASA ERC/AESP/CORE, the Planetary Society, and Dawn International partners. The team presented information and resources on Vesta Fiesta through a section on the Dawn Web site. This section reports Web site statistics on the Vesta Fiesta event pages and survey responses from Vesta Fiesta event hosts.



Figure 13. Locations of Vesta Fiesta public and private events.



Figure 14. Celebrating Vesta Fiesta at the Flagship event in Pasadena, CA.

Vesta Fiesta: Outreach Dissemination

E/PO team members disseminated a wide variety of activities and materials during Vesta Fiesta events. Figure 15 displays the quantities of materials disseminated at these events.

Overall, the Dawn E/PO team disseminated a large number of Dawn Fact Sheets ($n = 8,850$), Dawn Bookmarks ($n = 8,850$), Dawn Stickers ($n = 5,950$) and Dawn Vesta Fiesta magnets ($n = 4,400$) at the Dawn Vesta Fiesta events. Additionally, the team provided hard copies of games, activities, and flyers.

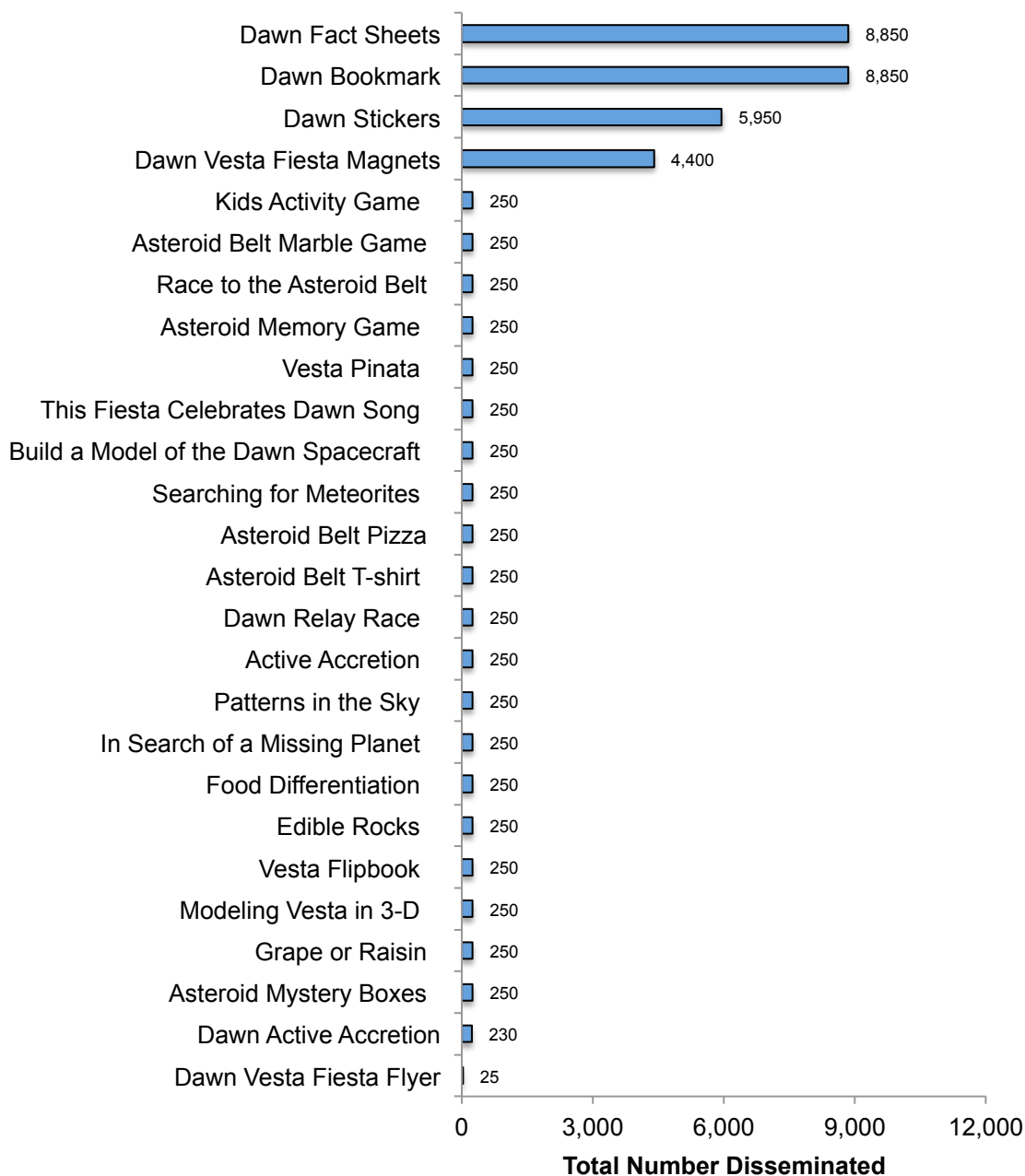


Figure 15. Total hard-copy materials disseminated at Vesta Fiesta events.

In addition to the Vesta Fiesta page on the Dawn Web site, the Dawn E/PO team advertised the event through 9 publications, 21 listservs, 9 web pages other than Dawn's, 4 podcasts or radio shows, and disseminated information to 6,483 newsletter subscribers. On social media platforms, the Dawn E/PO team shared information through a Vesta Fiesta Public Event, Facebook posts, and Twitter. A total of 35 users noted they would attend Vesta Fiesta through a Facebook Event page posting in July 2011. Additionally, the Dawn Mission Facebook page posted seven wall posts about the event between July and August 2011 and received 50 "likes" to these status updates. The Deep Impact Flyby mission also included a Facebook post about Vesta Fiesta on their Facebook wall. Finally, the team sent out eight

tweets about Vesta Fiesta on the NASA Dawn Twitter page between June and August 2011. Twitter users retweeted the information 31 times during this period.

Vesta Fiesta: Web Site Usage Statistics

The Vesta Fiesta event section of the Web site was created in April 2011; this section of the report describes data received April 2011–September 2011. Overall, the majority of users who visited the Vesta Fiesta event section of the Web site looked at the Event Homepage or the Attend an Event page (see Figure 16).

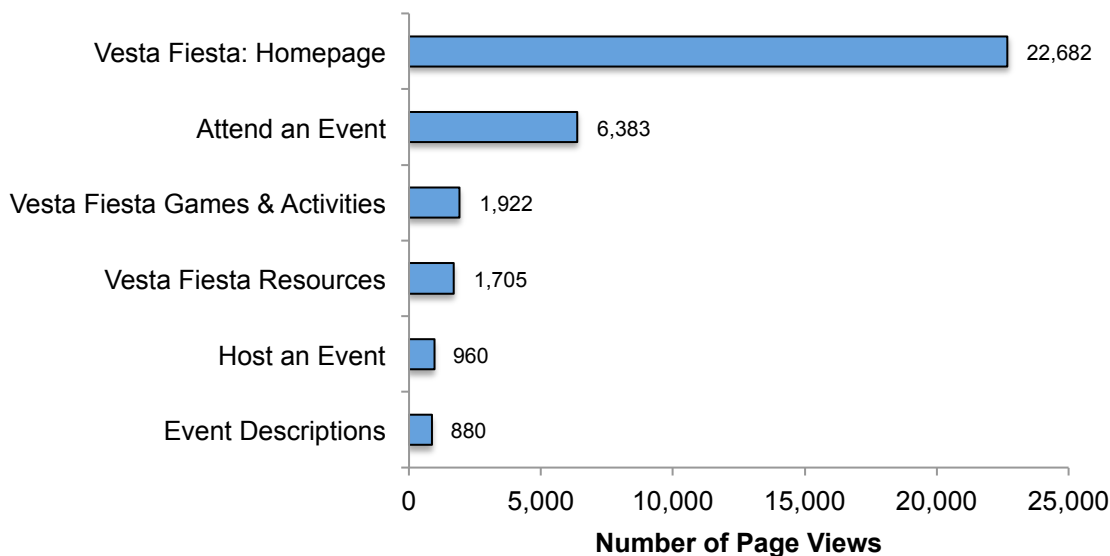


Figure 16. Number of page views in the Vesta Fiesta event section of the Web site between April 2011–September 2011.

On the Dawn Web site, users also had access to various advertising materials. Visitors to the site frequently downloaded Vesta Fiesta recruitment postcards ($n = 145$) and recruitment flyers ($n = 138$). Additionally, 74 users downloaded a Vesta Fiesta press release, and 37 users downloaded a thank you letter from Chris Russell, Dawn Principal Investigator ($n = 37$).

To prepare for sharing information about the mission, users downloaded or accessed a variety of presentation materials. A total of 173 users visited the page with audio files from the Dawn Mission team, and 61 users accessed the Dawn Information for Hosts file. Additionally, 41 visitors downloaded the Vesta Fiesta Dawn Mission Overview PowerPoint.

During the Vesta Fiesta event weekend, at least 357 viewers participated in the live feed of the Vesta Fiesta Flagship celebration in Pasadena, California. Users also downloaded several Vesta Fiesta activities (see Figure 18). As mentioned previously, the Dawn E/PO team developed 20 games and activities for Vesta Fiesta and shared these activities through the Web site. The top five most common downloads were for the following activities: Asteroid Mystery Boxes, Modeling in 3-D, Build Your Own Dawn Spacecraft, Edible Rocks, and In Search of a Missing Planet.



Figure 17. Explaining the Dawn Mission at the Vesta Fiesta Flagship event in Pasadena, CA.

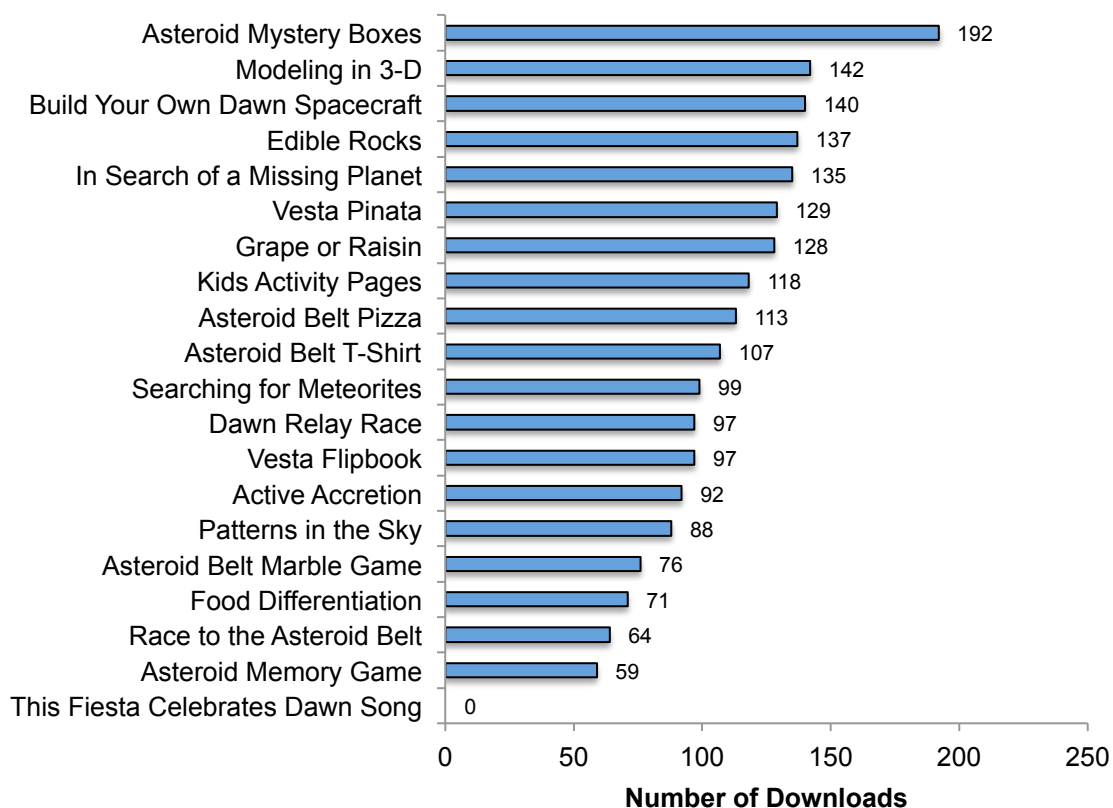


Figure 18. Number of Vesta Fiesta activity downloads.



Figure 19. Exploring at *Patterns in the Sky* Activity at the Vesta Fiesta Flagship event in Pasadena, CA.



Figure 20. Students getting ready to participate in the Dawn Relay Race at the flagship Vesta Fiesta event in Pasadena, CA.

User Perceptions of Event Quality and Utility

Vesta Fiesta event hosts from across the nation, and the world, reported using the Vesta Fiesta activities with their communities. The following sections present user perceptions of event quality and utility. Fifty-two Vesta Fiesta event hosts, of a total 109, responded to a survey asking for feedback on their Vesta Fiesta events. The mean number of attendants at Vesta Fiesta events was 129.11 (Range 2-2,358).

Event hosts provided information on how they heard about Vesta Fiesta (Figure 21). The majority (49%) learned about Vesta Fiesta through *other* sources, listservs, or friends. *Other* sources listed included the NASA/Dawn Web site ($n = 7$), an EPO team member ($n = 4$), the Solar System ambassador program ($n = 3$), a museum ($n = 3$), NASA email/news ($n = 2$), a teleconference ($n = 2$), Google ($n = 2$), a newspaper ($n = 1$), college ($n = 1$), newsletter ($n = 1$), or a different Web site ($n = 1$).

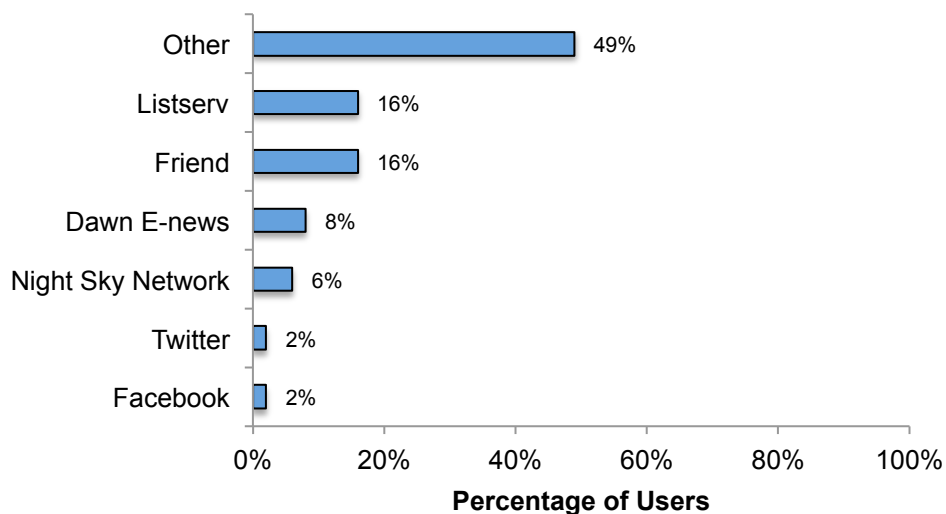


Figure 21. How event hosts heard about Vesta Fiesta ($n = 49$).

Event hosts invited visitors to their Vesta Fiesta events in a variety of ways (see Figure 23). Most hosts reported using email (65%), or social media (e.g., Facebook, Twitter) (42%), with 48% noting that Vesta Fiesta occurred during a regularly scheduled event. Additionally, some hosts referenced *other* methods for inviting visitors including another Web site ($n = 5$), newsletter ($n = 2$), word of mouth ($n = 2$), Astronomy meeting ($n = 1$), NASA Days at Busch Gardens ($n = 1$), posted on NASA Space Network ($n = 1$), listserv ($n = 1$), or a University Events Calendar ($n = 1$).



Figure 22. Visitors looking at the night sky through 250mm Cassegrain telescopes at Vesta Fiesta a Saint-Barthélemy in Italy. Image Credit: Matteo Soldi (FCF).

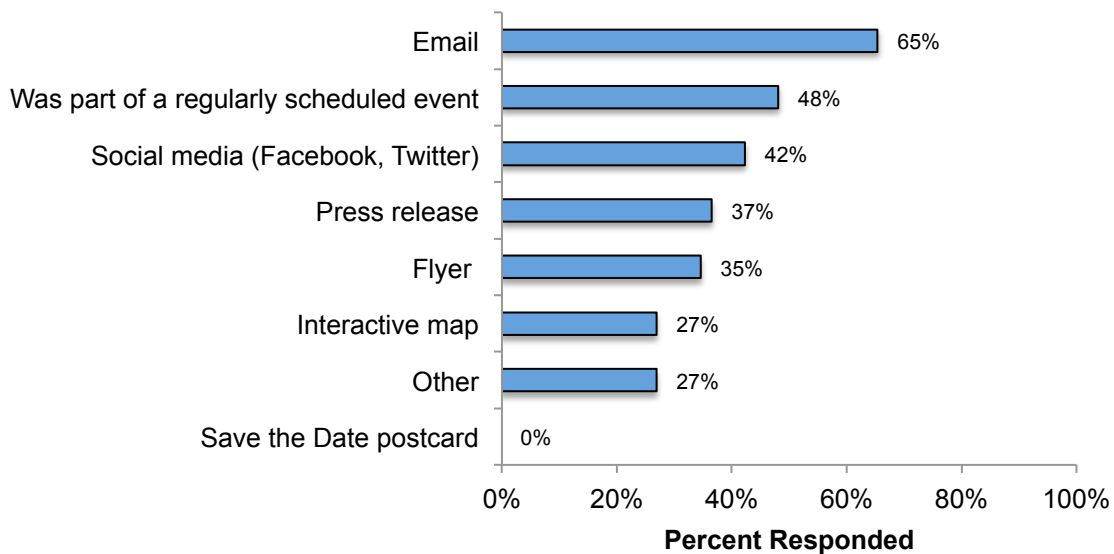


Figure 23. How event hosts invited people to their Vesta Fiesta event ($n = 52$).

At the Vesta Fiesta events, participants engaged in a variety of activities. Most event hosts reported having a PowerPoint presentation (60%), Vesta viewing (40%) or *other* activity (40%) (see Figure 24). *Other* activities included viewing other objects through telescopes ($n = 7$), having a star party ($n = 6$), having an observatory/planetarium event night ($n = 5$), having games/information ($n = 2$), opening a new exhibit ($n = 1$), having a workshop ($n = 1$), or having food available ($n = 1$).

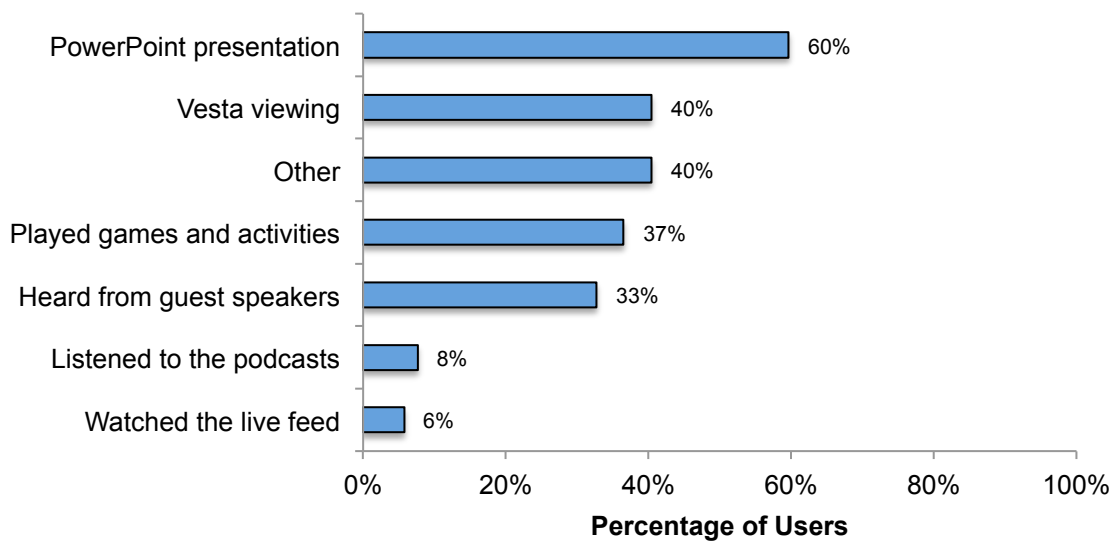


Figure 24. Event host reports of activities at Vesta Fiesta events (n = 52).

Event hosts provided feedback on the usefulness and quality of online information and resources. Overall, the majority of hosts believed the online information and resources for Vesta Fiesta were *very helpful* (71%) or *helpful* (22%). Two percent believed the resources were *somewhat helpful* and four percent believed they were *not helpful*.

“We are really thrilled to have access to these resources...very accessible, engaging, and educative.”

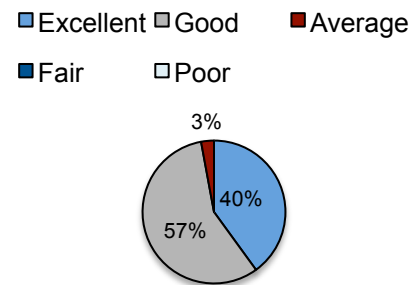


Figure 25. Event host perceptions of Vesta Fiesta game and activity quality (n = 35).

The majority of event hosts rated the quality of Vesta Fiesta activities and games as *good* (57%) or *excellent* (40%) (see Figure 25).

Event hosts offered feedback on why they hosted their Vesta Fiesta event. Most users hosted the event to help others learn more about the Dawn Mission (75%), to participate in an international event (56%), because it sounded fun (56%), or because it was part of a regularly scheduled event (52%) (see Figure 26). Users who selected *other* reasons mentioned a desire to help others learn about planetary exploration (n = 3), outreach efforts (n = 1), that the event coincided with the opening of another exhibit (n = 1), or being an asteroid enthusiast (n = 1). All Vesta Fiesta event hosts indicated that they would host a future event.

“Vesta Fiesta was an excellent addition to our annual Astronomy Day Fair. Kids and adults participated and enjoyed the activities. Everyone was fascinated.”

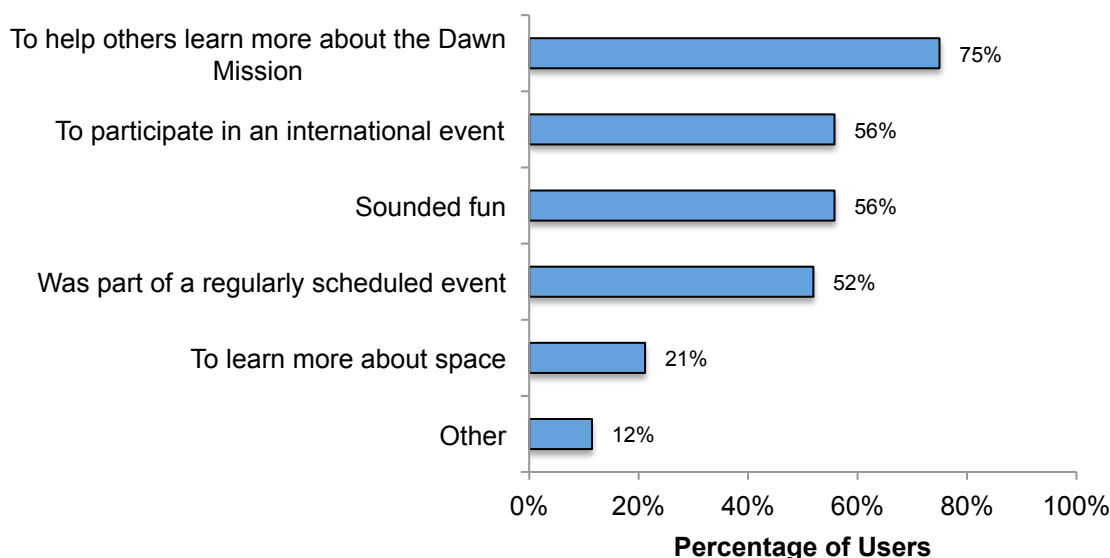


Figure 26. User reports of why they decided to host a Vesta Fiesta event ($n = 52$).

In their open-ended feedback, Vesta Fiesta event hosts suggested additional resources or types of support that would be useful for future events. Overall, user responses fell into the following categories:

- Requesting more advance notice of the event ($n = 3$)
- Asking for a chart with Vesta's position ($n = 3$)
- Requesting a Fact Sheet with key information points in one place ($n = 2$)
- Experiencing difficulty with the Web site (e.g., crashed during event, live feed incompatible with Macintosh) ($n = 2$)
- Desiring additional videos about Vesta (e.g., motivational and in a variety of compatible formats) ($n = 2$)
- Asking for NASA Giveaways ($n = 1$)
- Having the Web site in different languages ($n = 1$)

SUMMARY

Across the 2009–2010 and 2010–2011 reporting periods, the Dawn Mission Web site received a combined 7,076,500 hits and 2,778,173 page views. The majority of visitors across both reporting periods visited the Dawn Homepage, Mission Section: Where is Dawn Now? page, and the Mission Section: Main page. Additionally, at least 4,300 users in 2009–2010 and at least 5,000 visitors in 2010–2011 downloaded the Dawn Mission Fact Sheet. The Ion Propulsion Charges Student Reading was downloaded approximately 2,000 times during each reporting period, and the Ion Propulsion Student Reading was downloaded approximately 1,700 to 2,000 times over each reporting period.

Across both reporting periods, visitors found the site to be a useful resource that was easy to navigate, well organized, and with accurate content. Site visitors also believed the site increased their understanding of the solar system and increased interest in Dawn Mission science content. Overall, visitors believed the site mostly met their needs and rated the overall site as *good*. Respondents mentioned multimedia, the Mission Overview, and the overall site as favorite site aspects. Common requests for additional information pertained to more frequent images or videos of Vesta and more frequent status updates.

Over 22,000 individuals read about Vesta Fiesta on the Dawn Mission Web site, and Vesta Fiesta events took place August 5–7, 2011 at 109 locations worldwide. Event hosts downloaded a wide variety of activity sheets as well as recruitment and presentation materials for the event. At their Vesta Fiestas, event hosts frequently reported showing PowerPoint presentations, having Vesta viewings, playing games/participating in activities, and hearing from guest speakers. Ninety-seven percent of event hosts believed the games and activities provided on the Vesta Fiesta Web site were good or excellent, and all event hosts indicated they would host a future event. For future events, hosts requested more advance notice and additional materials to support the event.

In addition to the Dawn Web site and Vesta Fiesta events, the Dawn E/PO team disseminated information about Dawn through presentations at workshops and public events. The team strategically leveraged resources by joining Discovery mission outreach providers in presenting thematic workshops that focused on cross-mission science topics.

Through the dissemination of high-quality and useful information, activities, and materials, the E/PO team is meeting its goals of increasing public access and use of Dawn materials and increasing public interest and understanding of the Dawn Mission. It is important to note that part of the impetus that compelled the Dawn science and E/PO teams' commitment to the *Image of the Day*, with the accompanying science team's interpretation of the image, was the desire to deepen the public's opportunity to be apprised of and engaged with mission findings.

RECOMMENDATIONS

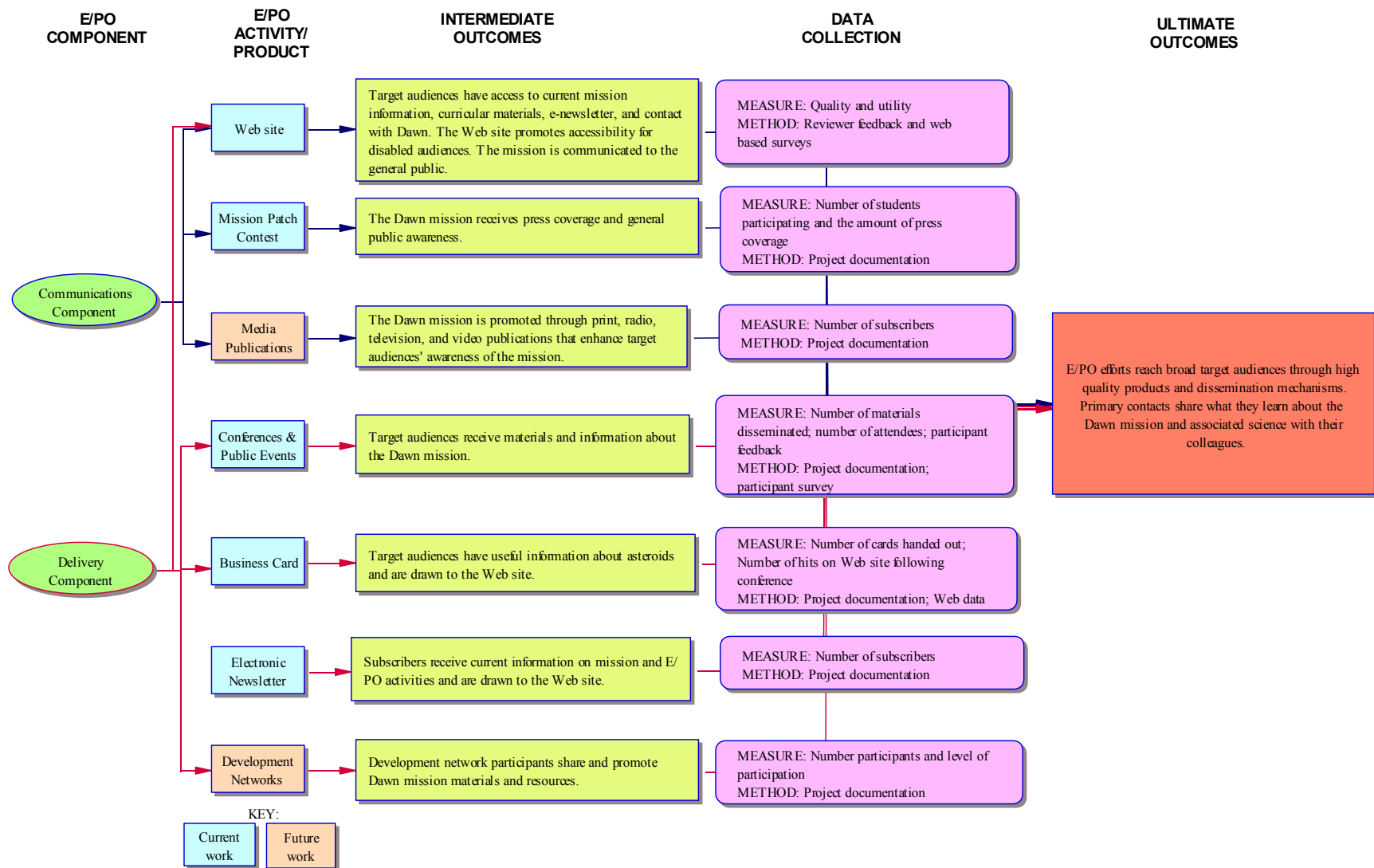
Based on the evaluation findings from the reporting period of August 2009 to July 2011, the following recommendations are provided for consideration by the Dawn E/PO team. These suggestions are intended to facilitate continued project success in project implementation and assure accountability with regard to project outcomes.

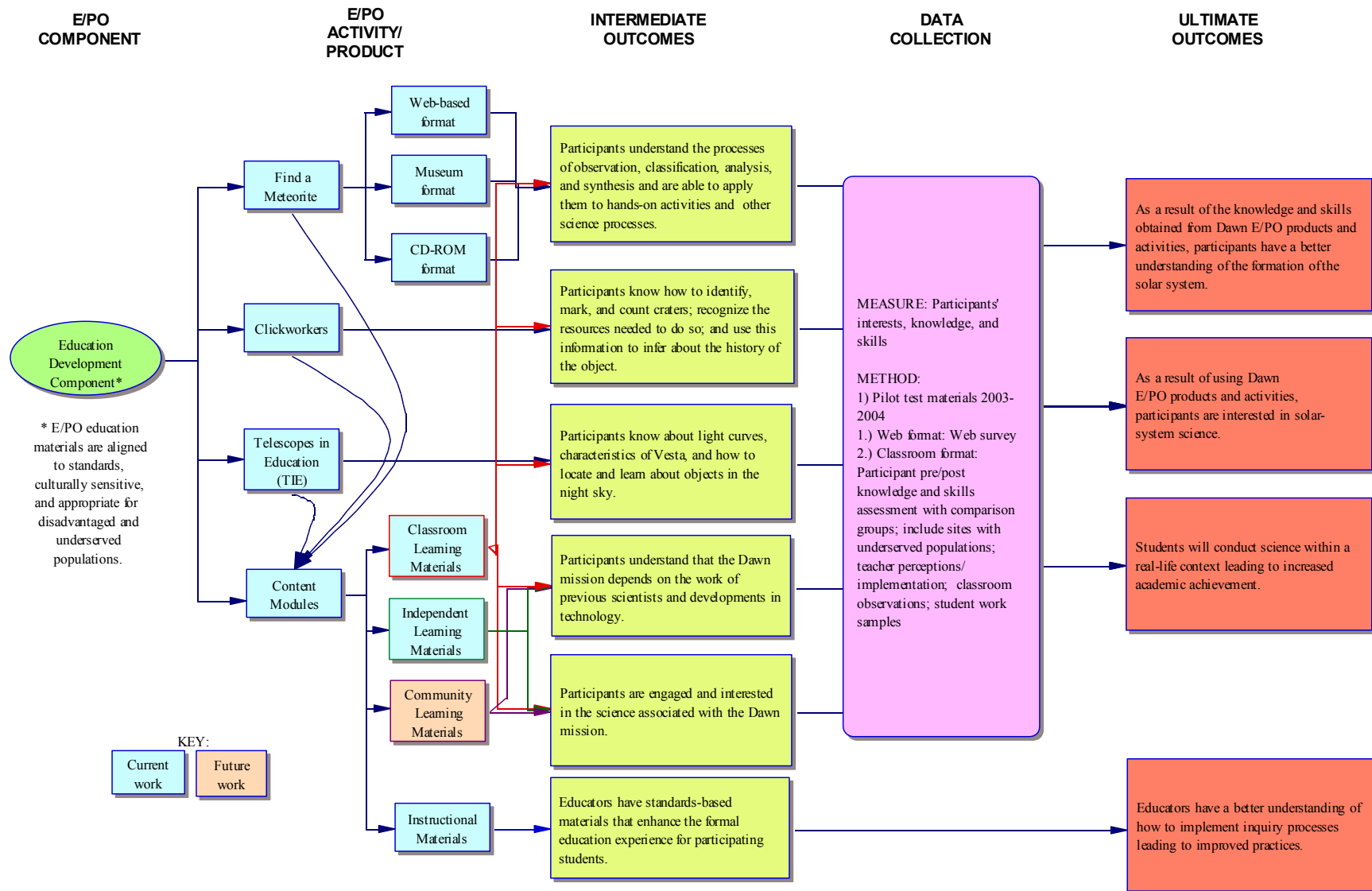
- Given the increasing popularity and use of the Web site during the Vesta arrival, it is recommended that the E/PO team try to find additional ways to engage the general public through the site. Consider adding more frequent images, status updates, and readings to engage the public. Additionally, frequent visitors might benefit from timestamps that allow them to see when new materials are added.
- Given the popularity of the Vesta Fiesta event and activities, it is recommended that E/PO team members continue to offer large-scale events for the Dawn mission. Team members might also consider providing at least a year of advance notice and including additional Fact Sheets and location charts for the event.
- Given the increasing popularity of social media, it is recommended that Dawn E/PO team members continue to use Twitter and Facebook to engage the general public in missions. Wall posts and tweets could refer the general public back to updated sections of the Web site or new events.
- For future outreach events, it is recommended that the Dawn E/PO team evaluate the quality and utility of social media efforts. For example, team members might consider obtaining user feedback on Twitter and Facebook posts to gauge user perceptions of these outlets for dissemination.

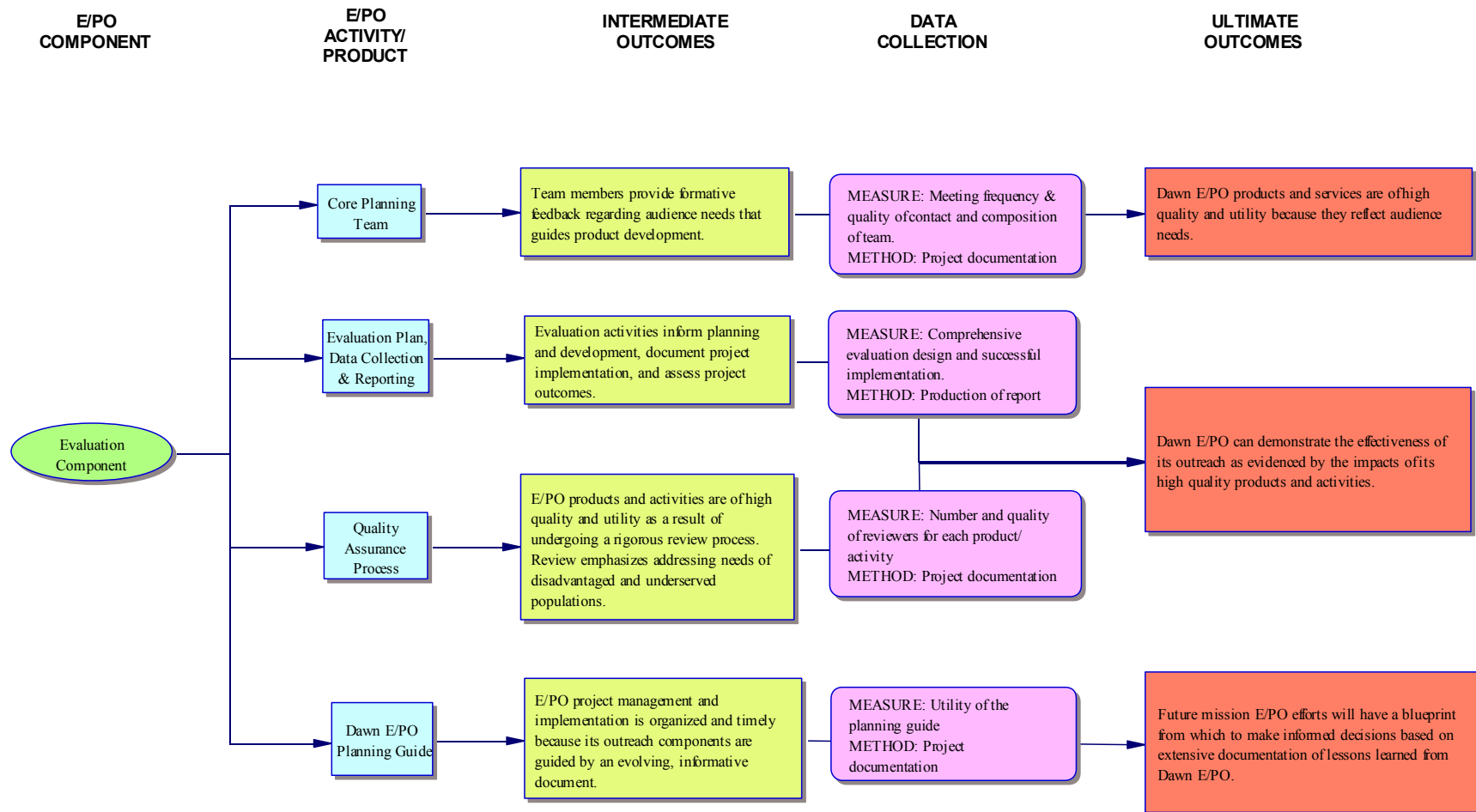
After reviewing this report, the Dawn E/PO team reflected on the recommendations and strategized ways to address the recommendations as Dawn E/PO work moves forward. Dawn E/PO team responses to recommendations, submitted to the evaluation team in February of 2012, are presented in Appendix C.

APPENDIX A

Logic Models for Dawn Education and Public Outreach







APPENDIX B

Evaluation Matrix

EVALUATION QUESTIONS	DATA SOURCES	DATA METHODS
Ultimate Outcomes #1 & #6: E/PO efforts reach broad target audiences through high-quality products and dissemination mechanisms. Dawn E/PO products and services are of high quality and utility because they reflect audience needs.		
Objective 1: To increase the availability of E/PO products and services related to the Dawn Mission.		
1. Do users of the Dawn E/PO materials and resources perceive them to be of high quality and utility? 2. To what extent do teachers and students access and use the Dawn E/PO materials and resources? 3. To what extent do public members access and use the Dawn E/PO materials?	Internal and external reviewers Web site users Workshop participants Teachers Students Public members	Quality assurance process Online surveys Participant feedback Web statistics Dissemination data
Student Ultimate Outcomes #2, #3 & #4: As a result of the knowledge and skills obtained from Dawn E/PO products and activities, participants have a better understanding of the formation of the solar system. Because of using Dawn E/PO products and activities, participants are interested in solar system science. Students will conduct science within a real-life context leading to increased academic achievement.		
Objective 2: To increase student awareness, interest, and understanding of space science.		
4. a. Are participating students engaged and interested in the Dawn Mission science because of using E/PO materials? b. Do participating students have an awareness of and interest in space-related careers as a result of the Dawn E/PO materials? 5. a. Do participating students have an increased understanding of the formation of the solar system? b. Do participating students using Dawn E/PO materials perform better than non-participants?	Students in pilot- and field-test sites Students who access online resources	Pre/post student performance data with non-equivalent comparison groups Student survey (print/online) Teacher reports
Educator Ultimate Outcomes #1 & #5: Educators have a better understanding of how to implement inquiry processes leading to improved practices. Primary contacts share what they learn about the Dawn Mission and associated science with their colleagues.		
Objective 3: To increase teachers' use of hands-on, inquiry-based educational materials related to the Dawn Mission.		
6. To what extent has the Dawn E/PO effort enhanced participating teachers' capacity to teach space science?	Teachers in development networks Participants in workshops Teachers accessing Web site resources	Pre/post assessment of capacity Participant evaluations Web-based surveys
Public Ultimate Outcomes #2 & #3: Because of the knowledge and skills obtained from Dawn E/PO products and activities, participants better understand the formation of the solar system. Because of using Dawn E/PO products and activities, participants are interested in solar system science.		
Objective 4: To increase public interest in and understanding of the Dawn Mission.		
7. To what extent has the Dawn E/PO effort affected public interest in and understanding of the Dawn Mission?	Public members accessing Web site or museum resources	Web-based surveys

APPENDIX C

Dawn EPO Team Response to Recommendations

Recommendation: Given the increasing popularity and use of the Web site during the Vesta arrival, it is recommended that the E/PO team try to find additional ways to engage the general public through the site. Consider adding more frequent images, status updates, and readings to engage the public. Additionally, frequent visitors might benefit from timestamps that allow them to see when new materials are added.

Response: The EPO team has undertaken a redesign of the navigation for the Web site. We will continue to search out opportunities to post the Dawn website URL in all forms of media.

The team is not inclined to engage in more images etc., but rather improving access and the experience. We are also undertaking a partnership to bring “citizen science” to the site with our Asteroid Mapper. In this way we plan to engage even more people, thus continuing to draw them to the Web site and our message. We want to add a science team status update. We will work on creating this update around process so as to preserve the impact of reporting the science results from the science team.

Recommendation: Given the popularity of the Vesta Fiesta event and activities, it is recommended that E/PO team members continue to offer large-scale events for the Dawn mission. Team members might also consider providing at least a year of advance notice and including additional Fact Sheets and location charts for the event.

Response: The EPO team is planning an event for when the spacecraft leaves Vesta. We are also making plans for our arrival at Ceres. These plans for Ceres will easily give plenty of advance notice. We plan to build on our existing network, Leader Guides (more effective than Fact Sheets), etc. to expand our reach and effectiveness. Additionally we will continue our existing collaborations with the Discovery Program, offering thematic professional development with a national reach.

Recommendation: Given the increasing popularity of social media, it is recommended that Dawn E/PO team members continue to use Twitter and Facebook to engage the general public in missions. Wall posts and tweets could refer the general public back to updated sections of the Web site or new events.

Response: The EPO team agrees that social media is important. We are exploring additional possibilities beyond Twitter and Facebook. We will continue to look for partnerships and opportunities to expand our reach through these options. We will work to highlight different sections of the Dawn website through targeted use of social media to help increase web traffic.

Recommendation: For future outreach events, it is recommended that the Dawn E/PO team evaluate the quality and utility of social media efforts. For example, team members might consider obtaining user feedback on Twitter and Facebook posts to gauge user perceptions of these outlets for dissemination.

Response: The Dawn EPO team will explore all of the existing opportunities for feedback through social media as well as look for new, emerging technologies for formative assessment of our programs and product.